

# H. Vogel. Photometer.

N<sup>o</sup> 75493

Patented Mar. 10, 1868.

Fig: 2.

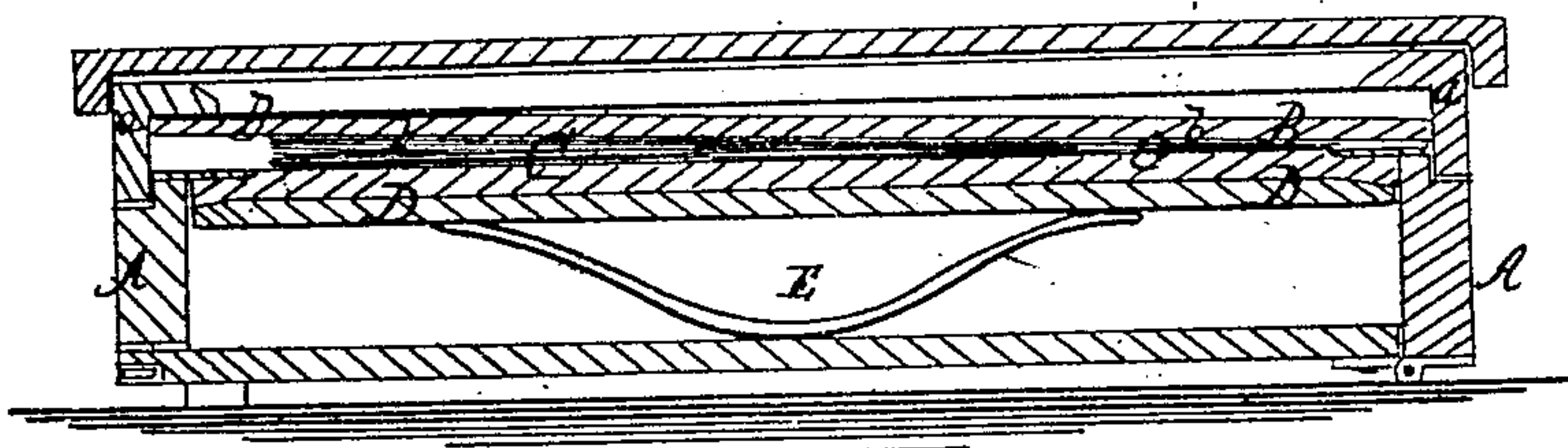


Fig: 1

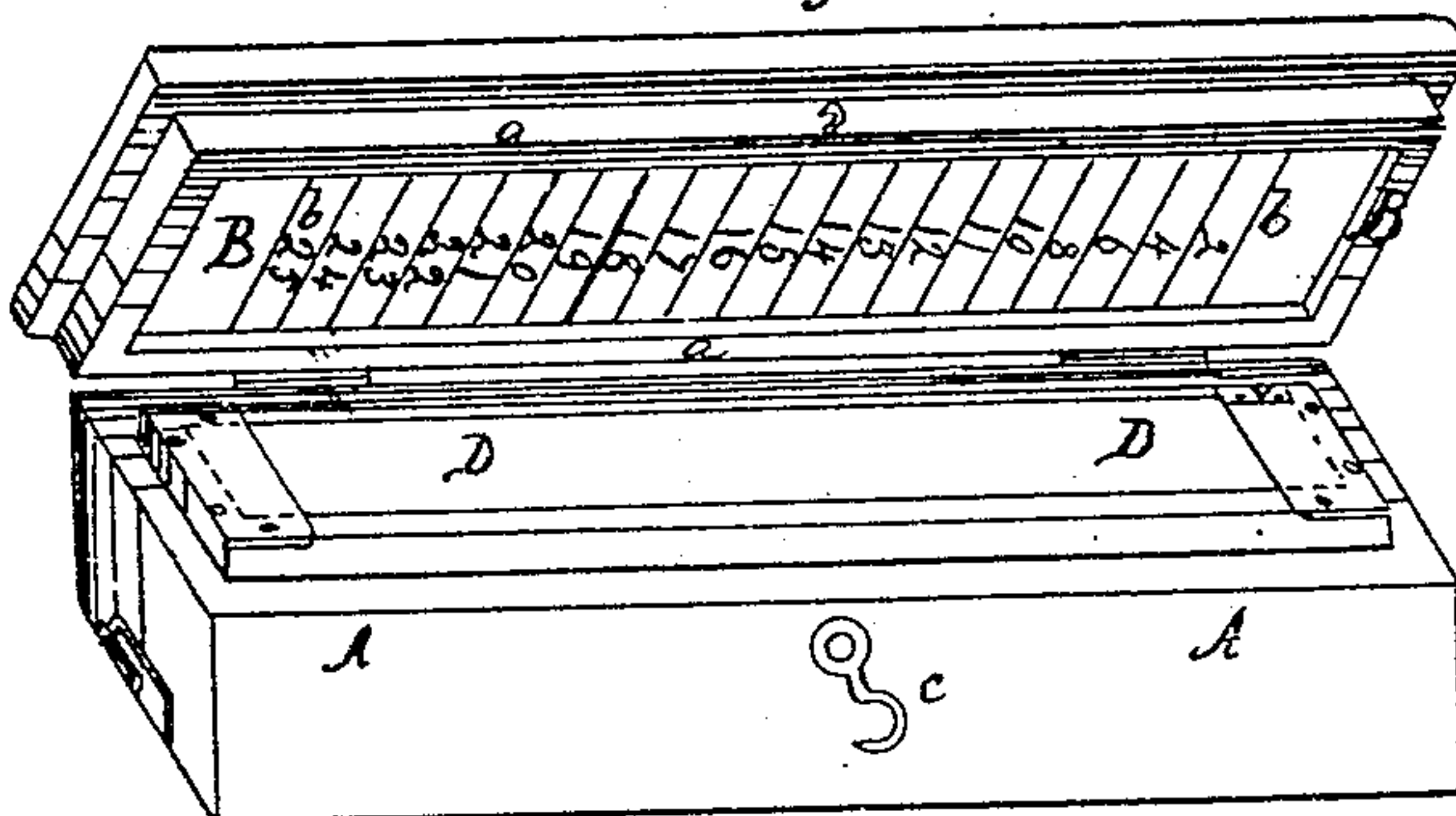
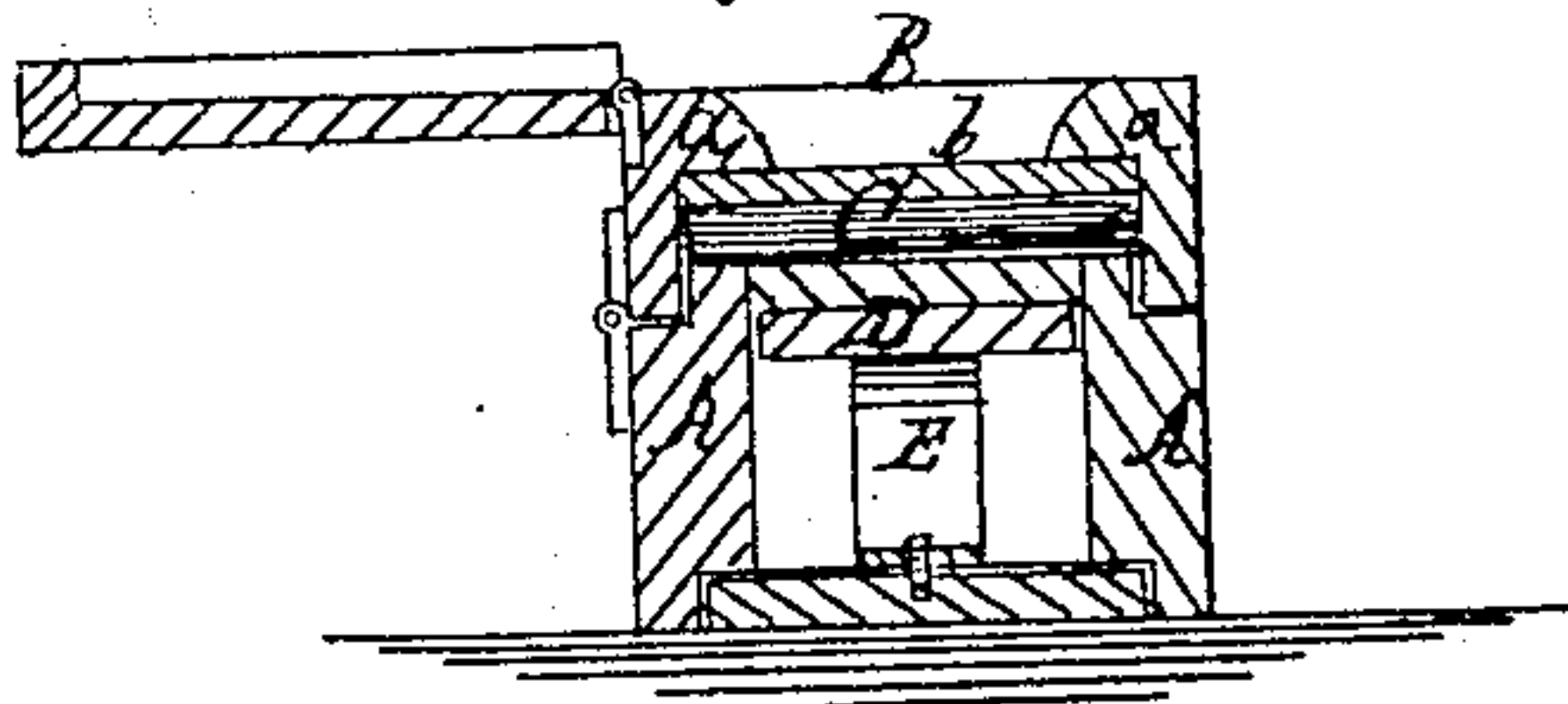


Fig. 3



Witnesses-

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Inventor.

H. Vogel  
per Munnell  
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# United States Patent Office.

DR. H. VOGEL, OF BERLIN, PRUSSIA, ASSIGNOR TO WILSON AND HOOD,  
OF PHILADELPHIA, PENNSYLVANIA.

*Letters Patent No. 75,493, dated March 10, 1868.*

## IMPROVEMENT IN PHOTOMETERS.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, Dr. H. VOGEL, of Berlin, Prussia, have invented a new and improved Photometer; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a perspective view of my improved photometer.

Figure 2 is longitudinal vertical section of the same.

Figure 3 is a vertical transverse section of the same.

Similar letters of reference indicate corresponding parts.

The object of this invention is to determine, with exactness, the time required for copying photographic negatives.

By the copying process, positives are to be produced upon paper from a negative taken in the camera. For this purpose a piece of very sensitive paper is placed upon the negative, and into the light, in which it remains until it has received the required impression from the negative. This impression is either directly visible or is made visible by a separate process. If it is directly visible, it is easy to determine the length of time during which the paper and negative are to be exposed to the light, as the progress of the copying process can be easily noticed. But if the process is invisible, it is imperatively necessary to determine beforehand the required length of time. If the right time has not been chosen, it is impossible to correct the mistake. But it is very difficult to determine the time, owing to the variations of the chemical intensity of daylight. To overcome these difficulties is the object of my invention, by means of which the necessary length of time for exposing any desired picture in any desired weather to the light can at once be ascertained.

A, in the drawing, represents a box, made of wood or other suitable material, of suitable size and shape, and provided with a hinged lid, B, as shown. The lid B consists of a wooden or other frame, *a*, by which a glass plate, *b*, is held. On the under side of this glass plate is secured a series of thin strips of paper, C, which are arranged in layers, each lower layer projecting beyond the edge of the layer above, as is clearly shown in fig. 2. The step system thus produced represents a semi-transparent medium, the transparency of which decreases by degrees toward the thicker end. Black figures upon the under side of the lower longest strip of paper indicate the number of layers arranged above each such figure, as will be clearly understood from figs. 1 and 2. The whole cover B, with the paper system on it, can be folded down and fastened, by means of a small hook, *c*, or other equivalent device.

Within the box A is arranged a sliding false bottom, D, which is, by means of a spring or springs, E, pressed upward against the paper, C, as shown in fig. 2. Upon this false bottom are placed a number of sensitive-paper strips. For this purpose I do not use silvered paper, which can only be preserved a short time, but paper which has been saturated with alkaline chromate, and which, as I have found, can be preserved for four weeks. These paper strips are pressed firmly against the under side of the paper, C, so as to fit well to the same. If this apparatus is then exposed to the light, the separate sections of the upper sensitive paper will be successively darkened—first that portion under No. 1, then that under No. 2, of the paper, C, and so forth. The paper will gradually become darker towards the thicker portion of the paper, C; the quicker, the more sensitive the paper is. Now it will be easy to recognize how far the chemical effect of the light has operated, as the printed portions of the paper, C, do not let the light pass through the paper, and will consequently leave that portion of the lower sensitive paper which is under the figure light, and these figures will therefore remain light on the sensitive paper after the same has been affected by the light. If the box is then opened in a not very light room, the place, to which the light has been able to affect the chromo-paper will be easily ascertained, and the last figure thus produced on the paper will show how many thicknesses of the paper, C, the light has been able to pass through during a given space of time, which occupies but a few seconds.

With this device it will be easy to indicate the correct time for exposing a negative to the light, especially when the novel carbon print is employed. The instrument is exposed to the light at the same time as the negative which is to be copied, and if the instrument shows six degrees, the first quarter of the negative is



covered; if eight, the second; if ten, the third; and if twelve, the fourth. In this manner the single parts to 6, 8, 10, and 12, have been copied. The picture is then developed, and notice is taken which part of it shows the required intensity. The same is the correct degree for copying.

If a number of negatives are to be printed, they are arranged according to their intensity, which is easily done by experts, and are then divided into three classes, so that they can be easily managed.

This apparatus can also be used with good advantage for indicating the time of taking negatives in the camera from bodies.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The arrangement of the transparent paper strips C, which are arranged in steps, and which are divided into sections, each section having an opaque portion, substantially as herein shown and described.

2. The box A, when provided with a cover, B, having a glass plate, *b*, and the step-formed paper C, and with the sliding false bottom D pressed against the paper C, by means of a spring, E, as set forth, all made and operating substantially as herein shown and described.

3. The paper strips, saturated with alkaline chromate, when they are applied to a photometer, substantially as herein shown and described.

The above specification of my invention signed by me, this twentieth day of November, 1867.

DR. H. VOGEL.

Witnesses:

B. BEEKMANN,

J. C. SCHAARWÄCHTER.